De pracht van priemgetallen. Het verhaal van een eeuwenlange zoektocht naar verborgen patronen, 2013, Prometheus, ISBN 978-90-351-3863-6 (pbk), 198 pp. by *Paul Levrie en Rudi Penne*

Rudi Penne & Paul Levrie

This book is only available in Dutch. Unfortunately, since the enthusiasm of the authors about prime numbers and mathematics in general is very inspiring. The authors form the male analog of the Dutch phenomenon of the *wiskundemeisjes* (Ionica Smeets & Jeanine Daems) who blogged their weekly column for *De Volkskrant* since 2006 on exciting mathematical topics. Unfortunately the blog was ended in 2010 and they can be followed via *Twitter*, but the archive is still available[1] although there seem to be some problems with *WordPress* since begin 2013. They also published a book *Ik was altijd heel slecht in wiskunde* in October 2013 which is a collection of their best columns. Penne and Levrie also have a math-blog *Wiskunde is Sexy*[2] they write for *Eos* since 2008 on a less regular basis. The book under review is not a collection of their blogs, but the collaboration for the blog has certainly been a source of inspiration for the book, which concentrates on prime numbers.

The authors address the readers as mathematical laymen, but nevertheless, they use formulas and theorems, but immediately putting the reader at ease, and putting mathematics and mathematicians in perspective. Juggling with numbers and number puzzles may seem a nerdy passtime, and yet at the same time, screening the most important mathematicians of all times and their relation with prime numbers shows that prime numbers are important building blocks of all numbers and, in a certain sense, also of a large part of mathematics in general.

In 47 (a prime number of course) short chapters, a great many names (the name index lists 87 names) are characters in the stage play of which the scenario is written by the prime numbers. From Aristotle to Harald Helfgott (who proved the weak Goldbach conjecture in May 2013), they all play a role. The first part of the book is mainly historical, but there are many excursions that you would not immediately connect with prime numbers. The space message launched since 1974 consisting of $1679 = 73 \times 23$ bits, towers of Hanoi, measuring the length of the equator, the concept of infinity (including a proof of Ramanujan's remarkable formula $1+2+3+\cdots = -1/12$), and modulo calculus (with related card tricks).

Of course also the *Great Problems of Mathematics* make their appearance: The Goldbach conjecture, Bertrand's postulate, the Green-Tao theorem, Gilbreath's conjecture, and of course the Riemann hypothesis. The nerdiest is their chapter 37 (another prime) called *Priempret* (Prime pleasure). One can imagine magic squares consisting of only prime numbers, or palindromic primes (palprimes), emirps (a non palindromic prime when written in reverse is again prime), sexy primes (a couple of primes that differ by 6), palinpoints (n is a palinpoint when it solves the equation $P(R(n)) = R(P(n))$ where $P(n)$ denotes the nth prime number and $R(m)$ reverses the order of the digits of number m), vampire numbers (I will let you look that up in *Wikipedia* yourself). How much of a geek can you be?

The best known applications of prime numbers is the composition of the IBAN bank account number and RSA public key cryptography. However, not only humans have created applications of primes. They also show up as the 17-year life cycle of certain cicadas, the construction of n-gons with ruler and compass is only possible when n is prime, etc.

Warning: this book may spread an infectious and very itchy prime virus among their readers.

Adhemar Bultheel

[1] `www.wiskundemeisjes.nl`

[2] `weetlogs.scilogs.be/index.php?blogId=11`